

## CONSUMPTION UNIT, INHALER AND MANUFACTURING METHOD

[0001] The present invention relates to a consumption unit for an inhaler comprising a liquid reservoir, a vaporizer device arranged in the liquid reservoir, and a vent having a flow channel extending in the liquid reservoir to a flow connection of the flow channel to the environment. The invention further relates to an inhaler and a method for manufacturing a consumption unit for an inhaler.

[0002] Conventional inhalers, such as electronic cigarette products are based on wick-coil technology. Capillary forces transport a liquid from the liquid reservoir along a wick until the liquid is heated by an electrically heated coil and thus vaporized. The wick serves as a liquid-conducting connection between the liquid reservoir and the heating coil comprised by the vaporizer device.

[0003] A disadvantage of the wick-coil technology is that an insufficient supply of liquid can lead to local overheating, which can result in the release of pollutants. This is known as “dry puff,” and it must be avoided.

[0004] The liquid-conducting connection between the heating coil and the liquid reservoir, as used in wick-coil technology, also has the disadvantage that leakage can easily occur. Thus, even an unfavorable storage of the inhaler and/or pressure fluctuations, for example, as can occur in an airplane, can lead to leakage.

[0005] Other generic liquid reservoirs are, for example, closed at one front end and comprise an opening at another front end which is closed by the vaporizer device. The front end closure of the liquid reservoir according to the prior art thus at least partially includes the wick carried through as a liquid conduit from the liquid reservoir to the heating coil and is therefore potentially leaky due to the sealing problem. Furthermore, the liquid reservoir can only be filled if the vaporizer device is not yet mounted in the liquid reservoir or connected thereto in a liquid-conducting manner, as a result of which the assembly steps in the manufacturing process cannot be freely selected in the sense of an economically and manufacturingly optimized sequence.

[0006] A generic liquid reservoir is described, for example, in patent application DE 10 2018 206 647.7, which had not yet been disclosed at the time of filing.

[0007] The invention is based on the task of providing an improved consumption unit with a more functional structure and/or improved liquid-tightness.

[0008] The invention solves the task with the features of the independent claims.

[0009] The invention has recognized that it is advantageous that the consumption unit is designed such that the vaporizer device is arranged in the liquid reservoir during filling. It is therefore proposed that the liquid reservoir comprises a filling opening for filling the liquid reservoir with liquid. By enabling filling through the filling opening, the vaporizer device can be mounted in the liquid reservoir during filling. This enables a liquid-tight seal and reliable retainer of the vaporizer device, which is beneficial to the handling and liquid-tightness of the consumption unit, since the wick feedthrough required in the prior art described previously is eliminated.

[0010] The filling opening is closed by means of a first closure part to reliably close the filling opening in a liquid-tight manner. The closure of the liquid reservoir by the first closure part may be non-destructively reversibly or irreversibly releasable by the consumer.

[0011] Preferably, the filling opening is formed by a free space between the vaporizer device and a wall of the liquid reservoir to provide a practicable embodiment. In this embodiment, when the consumption unit is in a mounted state, there is a free space between the vaporizer device mounted in the liquid reservoir and the wall, which serves as a filling opening and can be closed with the first closure part.

[0012] In a preferred embodiment, the liquid reservoir comprises an inner cross-sectional area perpendicular to a longitudinal direction of the flow channel which is larger than an outer cross-sectional area formed by the vaporizer device perpendicular to the longitudinal direction of the flow channel, wherein the filling opening is provided between the inner cross-sectional area of the liquid reservoir and the outer cross-sectional area of the vaporizer device. Due to the different cross-sectional areas, a free space is formed between the vaporizer device and the wall of the liquid reservoir, which comprises the size and shape of the difference between the inner cross-sectional area of the liquid reservoir respectively the inner contour and the outer cross-sectional area of the vaporizer device respectively the outer contour. The inner cross-sectional area of the liquid reservoir is thereby the cross-sectional area of the liquid reservoir at the location where the vaporizer device is arranged and/or retained. The outer cross-sectional area of the vaporizer device is given by the circumference or contour of the vaporizer device in the plane of the inner cross-sectional area of the liquid reservoir. In the present embodiment, it is sufficient that the vaporizer device comprises, at at least one location of its circumference, a diameter equal to the diameter of the cross-section of the liquid reservoir to be retained within the liquid reservoir. At at least one other location of the circumference, the vaporizer device comprises a diameter which is smaller than the diameter of the free inner cross-sectional area of the liquid reservoir in order to form the free space or the filling opening.

[0013] Advantageously, the inner cross-sectional area of the liquid reservoir is round and the outer cross-sectional area of the vaporizer device is oval to provide an effective embodiment. For example, the outer cross-section of the vaporizer device may be elliptical and a major semi-axis of the outer cross-section of the vaporizer device may be equal or nearly equal to the diameter of the inner cross-sectional area of the liquid reservoir. In this case, the vaporizer device would be supported at two points opposite to each other on the major axis of the oval-shaped outer cross-sectional area of the vaporizer device. At the same time, there would be one opening at each of two points on the minor axis opposite the oval-shaped outer cross-sectional area of the vaporizer device. One opening may be the filling opening, while the other opening may serve to vent the liquid reservoir during filling. Other oval or non-elliptical outer cross-sections of the vaporizer device are also conceivable. In this case, the openings can preferably be arranged and shaped centrically and/or symmetrically to one another. However, arrangements and shapes deviating from this are not excluded by the invention. In particular, the openings can be individually shaped and arranged for an optimal filling process and/or for a geometrically favorable shaping of the closure part. In particular, the openings can be arranged off-center if, for example, filling is to be performed laterally of the vaporizer device.